

Patent claims

1. System for inserting a weft thread into a shed of an air jet weaving machine (1), said system including a thread store (21), a measuring apparatus (23.1, 23.2) in order to be able to measure the weft thread (2) which is drawn off from the thread store (21), a plurality of air nozzles (3, 4, 5.1a-c to 5.na-c) for the insertion of the weft thread (2) and a control system (10) which is connected to the measuring apparatus (23.1, 23.2) in order to be able to control the compressed air supply of the air nozzles (3, 4, 5.1a-c to 5.na-c) in dependence on measurement values of the measuring apparatus (23.1, 23.2), characterized in that switch on points (x_j) are associated with the air nozzles (3, 4, 5.1a-c to 5.na-c); and in that the control system (10) charges one or more of the air nozzles (3, 4, 5.1a-c to 5.na-c) with compressed air as soon as a predictor value (x_F) for the position of the weft thread tip, which is formed with the help of the measurement values, reaches the switch on point (x_j) of the relevant air nozzle or air nozzles respectively.
2. A system in accordance with claim 1, with the air nozzles including at least one main nozzle (3) and/or tandem nozzle (4) and one or more relay nozzles (5.1a-c to 5.na-c), and with switch on points (x_j) being associated with the relay nozzles (5.1a-c to 5.na-c), and with the control system (10) charging one or more of the relay nozzles (5.1a-c to 5.na-c) with compressed air as soon as a pre-

dictor value (x_F) for the position of the weft thread tip which is formed with the help of the measurement values reaches the switch on point (x_j) of the relevant relay nozzle or relay nozzles respectively.

3. A system in accordance with claim 1 or claim 2, with the switch on point (x_j) of an air nozzle corresponding to the position of the air nozzle in the shed, or, respectively, in the case of a group of air nozzles (5.1a-c to 5.na-c) which are charged with compressed air at the same time, to the position of the first air nozzle (5.1a to 5.na) of the group.
4. A system in accordance with any one of the claims 1 to 3, with the predictor value (x_F) for the position of the weft thread tip containing a safety value or factor which depends in particular on the resolution of the measuring apparatus and/or on the switch on time for the pressure build up in the region of the relevant air nozzle and/or on the speed (v_F) of the weft thread tip.
5. A system in accordance with any one of the claims 1 to 4, with the predictor value for the position (x_F) of the weft thread tip and/or the speed (v_F) of the weft thread tip being formed as a result of the measurement values which are determined for the current weft thread (2).
6. A system in accordance with any one of the claims 1 to 5, with switch off points being associated with the air nozzles (3, 4, 5.1a-c

to 5.na-c), with the control system (10) switching off one or more of the air nozzles which are charged with compressed air as soon as the predictor value (x_F) for the position of the weft thread tip which is formed as a result of the measurement values reaches the switch off point of the relevant air nozzle or air nozzles respectively, and, in particular, with the switch off point having a predetermined distance from the switch on point of the relevant air nozzle or air nozzles respectively, and/or with the switch off point corresponding to the position of a subsequent air nozzle in the shed.

7. A system in accordance with any one of the claims 1 to 6, with the air nozzles (3, 4, 5.1a-c to 5.na-c) including at least one main nozzle (3) and/or tandem nozzle (4) and one or more relay nozzles (5.1a-c to 5.na-c), and with it being possible to couple the switch off points of the main nozzle (3) and/or tandem nozzle (4) to the switch off point of a predetermined relay nozzle (5.1a-c to 5.na-c).
8. A system in accordance with any one of the claims 1 to 7, with the thread store (21) being formed as a drum store onto which the weft thread can be wound, and with the measuring apparatus being arranged at the thread store (21) and including at least one sensor (23.1, 23.2) in order to be able to measure the draw off of windings and/or of partial windings from the drum store (22).
9. A system in accordance with any one of the claims 1 to 8, with at least one additional sensor being provided in the path of travel of

the weft thread in order to be able to measure the position of the weft thread tip, and/or a weft thread monitor (7) on the weft thread arrival side of the shed.

10. A system in accordance with any one of the claims 1 to 9, with the system additionally including a thread brake (9) in order to be able to brake the weft thread (2) in particular towards the end of the weft insertion when the weft thread tip approaches the weft thread arrival side of the shed.
11. A system in accordance with any one of the claims 1 to 10, with the control system (10) additionally including a regulation device (10.2) which is connected to the sensors (23.1, 23.2) and/or to the sensor in the path of travel of the weft thread and/or to the weft thread monitor (7) in order to be able to determine, from the measurement values of the sensors and/or of the weft thread monitor (7), the time required for the insertion of the weft thread (2) and to be able to compare it with a predetermined desired insertion time, and in order to be able to regulate the pressure and/or the blowing time and/or the flow through the air nozzles (3, 4, 5.1a-c to 5.na-c) using the difference between the time required for the insertion of the weft thread (2) and the desired insertion time.
12. Method for the insertion of a weft thread into a shed of an air jet weaving machine (1), in said method the weft thread (2) being drawn off from a thread store (21), the drawn off weft thread (2)

being measured with the help of a measuring apparatus (23.1, 23.2), the weft thread (2) being inserted into the shed by means of a plurality of air nozzles (3, 4, 5.1a-c to 5.na-c) and a control system (10) controlling the compressed air supply of the air nozzles (3, 4, 5.1a-c to 5.na-c) in dependence on measurement values of the measuring apparatus (23.1, 23.2),

characterized in that

switch on points (x_j) are associated with the air nozzles (3, 4, 5.1a-c to 5.na-c);

and in that predictor values (x_F) for the position of the weft thread tip are formed with the help of the measurement values;

and in that, in particular, a safety value or factor is contained in the predictor values (x_F) for the position of the weft thread tip;

and in that the control system (10) charges one or more of the air nozzles with compressed air as soon as a predictor value (x_F) for the position of the weft thread tip, which is formed with the help of the measurement values, reaches the switch on point (x_j) of the relevant air nozzle or air nozzles respectively.

13. A method in accordance with claim 12, with the time which is required for the insertion of the weft thread (2) additionally being determined and compared with a predetermined desired insertion time, and using the difference between the time required for the insertion of the weft thread (2) and the desired insertion time being used in order to regulate the pressure and/or the blowing time and/or the flow through the air nozzles (3, 4, 5.1a-c to 5.na-c).

14. An air jet weaving machine (1) including a system in accordance with any one of the claims 1 to 11 and/or for carrying out a method in accordance with any one of the claims 12 or 13.